

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1-13 (Canceled).

14. (Currently Amended) A method of processing signals received corresponding to a signal an emitted signal, the emitted signal comprising by recurrence two pulses, a first Doppler tolerant broadband pulse and a second Doppler intolerant broadband pulse, said method comprising:

detecting objects performed on the part of the signal received corresponding to the first pulses Doppler tolerant broadband pulse transmitted at each recurrence and providing an alarm for each object detected, and;

applying a matched filtering to the signal received corresponding to the second Doppler intolerant broadband pulse transmitted for each recurrence, said filtering making, for each detected object having satisfied at least a predetermined criterion of selection, correlations between said signal and several dopplerized copies of said transmitted second pulse, said correlations producing several signals corresponding to several Doppler channels; and

performing a Doppler classification of classifying the detected objects detected;

wherein said Doppler classification of the objects detected is performed on the part of the signal received corresponding to the Doppler intolerant pulses for the alarms satisfying at least one predetermined criterion by comparing with a threshold the Doppler of every detected object having satisfied at least a predetermined criterion of selection, this Doppler being determined from the signals resulting from the application of the matched filtering.

15. (Currently Amended) The method of processing signals as claimed in claim 14, wherein the predetermined criterion applied to the alarms comprises every detected object is

based on a comparison of the alarms~~sits~~ energy with a predetermined threshold.

16. (Currently Amended) The method of processing signals as claimed in claim 15, further comprising a step of applying a first matched filtering to ~~of the~~ part of the signal received corresponding to the Doppler tolerant pulses said applying step taking place before the detection of objects and providing a signal corresponding to an energy $E_{HFM}(v,t)$.

17. (Currently Amended) The method of processing signals as claimed in claim 16, wherein the first~~said first~~ matched filtering comprises:

correlating the part of the signal received corresponding to ~~the~~ a Doppler tolerant pulse ~~tolerant pulse with a copy of the said Doppler tolerant pulse,~~

applying a step of ~~rms~~ detection of ~~the~~ the correlated signal and providing signals representing the energy as a function of channel and time $E_{HFM}(v,t)$.

18. (Currently Amended) The method of processing signals as claimed in claim 14, wherein said step~~the step~~ of detecting objects comprises:

searching for the local energy maxima $E_{HFM}(v,t)$ by comparison with a predetermined energy threshold E_s ,

normalizing the maxima obtained by calculation for each local maxima of the value $(E_{HFM}-M)/\sigma$, M being the mean of the reference noise and σ the corresponding standard deviation,

eliminating the maxima of lower normed energy,

selecting the alarms corresponding to non-eliminated normed maxima ~~not eliminated~~ that are greater than a predetermined threshold of normed energy E_{SN} .

19. (Currently Amended) The method of processing signals as claimed in claim 17, wherein said step of detecting objects comprises:

searching for the local energy maxima $E_{HFM}(v,t)$ by comparison with a predetermined energy threshold E_s ,

normalizing the maxima obtained by calculation for each local maxima of the value $(E_{HFM}-M)/\sigma$, M being the mean of the reference noise and σ the corresponding standard deviation,

eliminating the maxima of lower normed energy,
selecting the alarms corresponding to non-eliminated normed maxima not eliminated
that are greater than a predetermined threshold of normed energy E_{SN} .

20. **(Currently Amended)** The method of processing signals as claimed in claim 14, further comprising a step of estimating Doppler d_i of the alarms *i* corresponding to the Doppler intolerant pulses for the alarms satisfying at least one predetermined criterion, and/or the associated standard deviations σ_{d_i} of the detected objects satisfying at least one predetermined criterion, and/or its associated standard deviations σ_{d_i} , said estimation being made on the basis of the signals arising from the Doppler channels.

21. **(Currently Amended)** The method of processing signals as claimed in claim 20, wherein the inherent Doppler is estimated at each instant:

either on the basis of a Doppler of the part of the signal received corresponding to the reverberation of the Doppler intolerant pulses,

or, on the basis of the spectrum of the reverberation spectrum obtained by an emitted frequency pulse (FP) code of the part of the signal received corresponding to the pulses FP when pulses FP have been emitted.

22. **(Currently Amended)** A method of processing signals received corresponding to a signal emitted comprising by recurrence two pulses, a first Doppler tolerant broadband pulse and a second Doppler intolerant broadband pulse, said method comprising

forming a first channel comprising the part of the signal received corresponding to the Doppler tolerant pulses, and a second channel comprising part of the signal received corresponding to the Doppler intolerant pulses,

applying a first matched filtering to the signal on the of the first channel followed by an

object detection process before the detection of objects,

detecting the providing an alarm for each object detected,

selecting in the second channel objects the alarms satisfying at least the least a predetermined energy criterion in the second channel,

applying a second matched filtering on the signal of the second channel around the selected objects alarms selected,

estimating in the second channel the Doppler estimation of the alarms selected objects in the second channel,

estimating inherent Doppler,

the classifying of the selected objects by discrimination between the between bottom echoes and the and true echoes on the basis of the values of the Doppler of the alarms selected objects estimated in the second channel and of the inherent Doppler, and

eliminating on the in the first channel the alarms detected corresponding to bottom echoes.

23. (Currently Amended) The method of processing as claimed in claim 22, A method of processing signals received corresponding to a signal emitted comprising by recurrence two pulses, a first Doppler tolerant broadband pulse and a second Doppler intolerant broadband pulse, said method comprising:

forming a first channel comprising the part of the signal received corresponding to the Doppler tolerant pulses, and a second channel comprising part of the signal received corresponding to the Doppler intolerant pulses;

applying a first matched filtering to the signal on the first channel followed by an object detection process;

providing an alarm for each object detected;

selecting in the second channel objects based upon the provided alarms that satisfy at least a predetermined energy criterion;

applying a second matched filtering on the signal of the second channel around the selected objects;

estimating in the second channel a Doppler of the selected objects;

estimating inherent Doppler;
classifying the selected objects by discrimination between bottom echoes and true echoes
on the basis of values of the Doppler of the selected objects estimated in the second channel and
of the inherent Doppler; and
eliminating in the first channel the alarms detected corresponding to bottom echoes;
wherein the emitted signal using jointly signals coming come from a pulse of HFM type,
and coming from a pulse of BPSK type, the two pulses being emitted in the same recurrence.

24. (Previously Presented) An active sonar comprising,
means of emitting a signal comprising by recurrence two pulses, a Doppler tolerant
broadband pulse and a Doppler intolerant broadband pulse, and
means of receiving the signal emitted implementing the method of processing signals as
claimed in claim 23.

25. (Currently Amended) The active sonar as claimed in ~~claim 11~~claim 24, wherein the
means of emission emit the two pulses at different instants with totally or partly overlapping
frequency bands.

26. (Currently Amended) The active sonar as claimed in ~~claim 11~~claim 24, wherein the
means of emission emit the two pulses simultaneously with distinct frequency bands.